

Harmer is not entitled to further accommodation under the ADA." A contrary affidavit from Harmer's doctor was not sufficient, according to the court, "to raise a genuine issue of fact given the doctor's lack of knowledge of Harmer's duties and working conditions." The court also rejected Harmer's claims that Virginia Power had retaliated against him after he requested a smoking ban.

For purposes of deciding the motion for summary judgment, the court assumed that Harmer was disabled under the ADA. Thus, the court did not make that determination upon the merits of the case. The court also detailed the efforts undertaken by Virginia Power to accommodate Harmer's complaints about ETS. Beginning in 1990, the court said, Virginia Power provided employees with fans, smokeless ashtrays and air purifiers and moved employees to increase the space between smokers and nonsmokers. Virginia Power also prohibited smoking in common areas of the building in 1990, and then, in consideration of the EPA Risk Assessment on ETS, restricted smoking to separately-ventilated smoking rooms in 1993. The court determined that this voluntary change in policy did not render the case moot.

RESIDENTIAL EXPOSURE: CHILD CUSTODY

- [21] *Harkness v. Henderson* (Family Court, Contra Costa County, California) (January hearing scheduled)

According to a legal newspaper, a January hearing is scheduled for a California woman's request to prevent her former husband from smoking in the presence of their two minor daughters, and the family court referee assigned to the case has requested information about the children's health and the alleged health effects of ETS exposure. The children's ages are 7 and 10.

The father, Steven Henderson, reportedly is litigating the issue actively. Henderson's lawyer frames the issue in terms of a parent's privacy, but the mother's lawyer says the primary issue is one of health. "[Henderson's] arguments suggest parents may do what they want with their children," the mother's lawyer is quoted as saying. "The civilized portions of the Western world discarded that theory in the last century."

Henderson's smoking did not become an issue in the case until after the parents met with a family court

services evaluator, according to the article. The mother, Sara Harkness, reportedly made no reference to smoking in her original motion to alter Henderson's visitation rights, which was filed earlier this year.

The services evaluator recommended not only that Henderson be prohibited from smoking in his children's presence, but that he also be ordered "to participate in appropriate treatment of tobacco addiction," the article states. The referee reportedly has ruled that ordering Henderson to enter a program to quit smoking would exceed her jurisdiction.

ETS claims in child custody cases have become increasingly common since the release of EPA Risk Assessment on ETS, the article asserts. John Banzhaf III of Action on Smoking and Health (ASH) is quoted as claiming that ETS exposure is now "one of the standard things you look at" in custody determinations. The impact of the risk assessment is confirmed by the Contra County family court services evaluator involved in the *Harkness* case. He estimates that the issue of a parent's smoking came up once or twice in his first 7 1/2 years on the job. "I bet it's come up half a dozen times in the last year," he is quoted as saying. See *The Recorder*, September 20, 1993.

GOVERNMENT BUILDING EXPOSURE

- [22] *Crum v. Department of Health and Human Services*, No. 93-265 (U.S. Supreme Court) (certiorari denied October 4, 1993)

The U.S. Supreme Court has denied a pro se petition for writ of certiorari filed by a man who sought to ban smoking in state and local government buildings in Virginia. Plaintiff Thomas Crump's claims allegedly arose out of an incident in a Virginia county courthouse in November 1991, when he observed someone smoking in a posted nonsmoking area. Further details about the case and the lower court opinions appear in issue 55 of this Report, September 10, 1993.

PRISONER CASE

- [23] *Rogers v. Romer*, 93-CV-1876 (U.S. District Court, Denver, Colorado) (filed September 8, 1993)

A Colorado prison inmate serving a life sentence has filed a pro se complaint against the Governor of

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Colorado and correctional facility officials, alleging that his Eighth Amendment right to be free from cruel and unusual punishment was violated when he was forced to share a double cell with smoking inmates. Inmate Joseph Rogers claims that he was "knowingly placed in a life threatening living environment when he was forced to breath second hand cigarette smoke, a known carcinogen."

Although his current cellmate reportedly is a non-smoker, Rogers is seeking an order restraining the defendants from placing him in a double-bunk cell with a smoking cell-mate, and an order placing him in a single cell. He is also seeking punitive damages against the defendants in the amount of \$165,000, and an injunction to prevent retaliatory punishment.

WORKPLACE: IAQ/HANDICAP DISCRIMINATION

- [24] *Heilweil v. Mount Sinai Hospital*, 1993 WL 300026 (U.S. District Court, Southern District, New York) (decided August 3, 1993)

A U.S. District Court has determined that an employee whose respiratory condition was allegedly exacerbated only by exposure to the poorly-ventilated air in her workplace was not a handicapped person under the Federal Rehabilitation Act. The employee, Donna Heilweil, had been terminated from her position as administrator of the employer's blood bank. According to the court, when she was not exposed to the air in the blood bank, she did not suffer respiratory problems.

Stating that "[a]n impairment which only renders one unable to perform one particular job is not a handicapped person with the meaning of the Act," the court ruled that Heilweil's condition did not substantially limit one or more of her major life activities as required by the federal statute. The court, in granting the employer's motion for summary judgment, also ruled that the state workers' compensation board had exclusive jurisdiction over Heilweil's claim that her employer had breached its common law duty to provide a safe workplace.

WORKPLACE: MULTIPLE CHEMICAL SENSITIVITY

- [25] *Conradt v. Mt. Carmel School*, 1993 WL 361221 (Wisconsin Labor and Industry Review Commission) (decided August 13, 1993)

A Wisconsin workers' compensation tribunal has rejected a school teacher's claim that exposure to moldy carpeting and chemical air fresheners caused her to suffer multiple chemical sensitivity. Claimant Donna Conradt had alleged that a nine-year roof leak caused dampness and mold to develop in her classroom's carpeting. Exposure to the mold, she alleged, caused an allergic reaction affecting her lungs, throat, ears, sinuses and severe headaches. Although she was relocated to another classroom, the school placed chemical air fresheners throughout the building in August 1989. Conradt claimed that this subsequent exposure caused an occupation injury as of February 1990, her last day of employment.

The experts testifying in the case differed over whether Conradt suffered a "sick building syndrome" or multiple chemical sensitivity injury. The commission found that the exposures alleged were "so far removed in time" from the date of injury as to "lack sufficient credibility" to meet Conradt's burden under the Worker's Compensation Act.

LEGAL ISSUES AND DEVELOPMENTS

- [26] "Study Examines Opinions, Actions on Smoking Policy," *BNA Daily Labor Report*, September 23, 1993

A study on the law and politics of smoking policy is detailed in a chapter of a new book titled *Smoking Policy: Law, Politics and Culture*. The author of the study is Stephen Sugarman, a University of California at Berkeley law professor. The study analyzes various strategies utilized by employers and insurers to discourage smoking. It also covers the politics of smoking control and lawsuits against the tobacco industry by smokers. According to the authors of the study, "when employers and insurers discriminate against those who smoke outside of work, various privacy losses are

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incurred by smokers, . . . the social value of individualized fair treatment is threatened, and the principles of collective responsibility may be violated in areas of American life where it has long held sway."

[27] "Environment Smoke Scream," T.H. Holt, *The Washington Times*, September 21, 1993

This commentary criticizes the EPA Risk Assessment on ETS and discusses some of the initiatives that have been taken by ASH in reliance on the risk assessment and the Americans with Disabilities Act. The author warns that the risk assessment will be used to support governmental intrusions into private homes. He states, "Nonsmokers and smokers alike should be concerned about the EPA's cavalier pronouncements on ETS. If ETS is sufficient justification for the government to mount citizens' doorsteps, what other minor, politically incorrect, social offenses might be the object of the Pest Class' next crusade? Fried foods? Alcohol, again? Belching?"

The author also notes that in the late 1800s when the Senate was asked to adopt a national ban on cigarettes, it refused to do so, saying it was a matter of state regulation. The article concludes by expressing concern that the government will not similarly restrain itself this time around.

The Washington Times printed a response to the Holt commentary by John Banzhaf, executive director of ASH. In his letter, Banzhaf attempts to refute the criticisms made by Holt of the ETS risk assessment. He also claims, "Dozens of nonsmokers have already won large court judgments and/or obtained court orders prohibiting smoking in private homes, all prior to the release of the EPA's report." He concludes by offering to provide the evidence and legal decisions to support his claims to Holt or anyone who writes to ASH to request them. See *The Washington Times*, September 26, 1993.

OTHER DEVELOPMENTS

[28] Restaurant Smoking Dispute Ends in Killing

According to a press report, a smoker who was ordered to put out her cigarette after lighting one in

the nonsmoking section of a fast food restaurant returned to the restaurant with a 12-gauge shotgun and killed one of the patrons who had complained about her smoking. The incident occurred September 28, 1993, at a Denny's restaurant in a San Francisco suburb. A suspect has been arrested; she is a 22-year-old mother of four. See *Associated Press*, September 30, 1993.

[29] Coalition to Advance "Sound Science"

Dr. Garrey Carruthers, former Governor of New Mexico and professor/economist at New Mexico State University, is creating a coalition of scientists, academicians, former public officials, and representatives from business and industry who are concerned about the advancement of sound science. The coalition is called The Advancement of Sound Science Coalition (TASSC), and its goal is to "advance the principles of science used to formulate public policy." Carruthers says he believes that public policy decisions are too often based on emotions and beliefs considered by some to be "politically correct."

[30] Washington, D.C., March Protests Bias Against Smokers

The first national march to fight "tobacco-related discrimination" took place on September 25, 1993, in Washington, D.C. Speakers reportedly questioned the accuracy of the studies used by EPA and used the names of the Rev. Martin Luther King, Jr., and Susan B. Anthony in urging the demonstrators to defeat "another form of tyranny." Forty-five adults and five children participated. See *The Washington Post*, September 26, 1993.

[31] Smokers Fly Freedom Air

The founder of a new airline specifically designed for smokers flew 60 passengers from Chicago to Los Angeles on the inaugural run of Freedom Air. Nonsmokers are reportedly allowed to book seats on Freedom Air, but they must sign a waiver saying they will not sue over ETS exposure. Founder Ted Hall is making several trips to test the market before deciding whether or not to go ahead with regular service. See *USA Today*, September 30, 1993.

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MEDIA COVERAGE

- [32] "Where There's Smoke There's Fire: Law Firms Get Tough on Smoking," S. Taylor, *Prentice Hall Law and Business*, April 19, 1993

This article discusses efforts to limit employee exposure to ETS in law firms across the country. Surveys of approximately 25 law firms in 1989 and 1993 reportedly show that smoking policies are generally more restrictive presently and that two firms in the survey have banned smoking altogether. According to the executive director of one law firm, more employees are complaining about ETS since the EPA released its Risk Assessment on ETS. The author of the article observes that it has been difficult for some firms to force their senior partners and clients to stop smoking indoors.

- [33] "Bar and Restaurant Workers Demand Protection from Secondhand Smoke," *Business Wire*, September 27, 1993

Stanton Glantz and three bartenders are demanding protection for California bar and restaurant workers from the alleged health effects of ETS exposure. The three bartenders are members of BREATH (Bar and Restaurant Employees Against Tobacco Hazards), a group which educates bar and restaurant workers and the general public about ETS. Dr. Glantz apparently stated that business does not change when communities go 100 percent smoke free and that "all that happens is bar and restaurant employees have a significantly safer place to work."

BREATH receives funds from Proposition 99, California's 1988 Tobacco Tax Initiative. BREATH is active in seven Bay Area counties.

SCIENTIFIC/TECHNICAL ITEMS

UPCOMING SCIENTIFIC MEETINGS

- [34] Indoor Air Quality Symposium, American Industrial Hygiene Conference and Exposition, Anaheim, California, May 22, 1994

An announcement and "call for notice of interest" is available for this one-day symposium on IAQ, to be

held in conjunction with the American Industrial Hygiene Conference and Exposition. According to the announcement, the symposium will include (i) discussion of threshold limit values (TLVs) and IAQ guidelines, (ii) the role of TLVs in identifying and resolving IAQ problems in office environments, and (iii) the question of whether there are "grounds for justifying different guidelines and standards for IAQ in industrial environments as opposed to office environments." The announcement did not indicate who would be the keynote speakers or presenters for the symposium.

- [35] Indoor Air Quality: An Overview for People Who Need to Know, the American Institute of Hazardous Materials Management (AIHMM), several sites and dates in 1993 and 1994

This one-day course is described as covering the issues and methods needed for understanding and resolving IAQ problems, emphasizing "practical aspects of what is known and how to apply it to [a] situation." The course description also states that IAQ "has become an increasing concern for both EPA and OSHA," and that "OSHA has been treating workplace IAQ complaints as indicative of probable occupational illnesses which must be reported and resolved." The course will debut on October 23, 1993, in Santa Fe, New Mexico; other sites and dates are listed in Appendix B.

LUNG CANCER

- [36] "Epidemiological Studies Relating Family History of Lung Cancer to Risk of the Disease," P.N. Lee, *Indoor Environment 2*: 129-142, 1993 [See Appendix A]

This review refers only briefly to ETS as a claimed lung cancer risk factor. The author concludes, based on a review of epidemiologic studies, that family history of lung cancer is associated with a two-fold increased lung cancer risk. He suggests that family history of lung cancer should be considered in designing and interpreting studies of "environmental factors" (including ETS exposure) and lung cancer risk.

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RESPIRATORY DISEASES AND
CONDITIONS — CHILDREN

- [37] "Road Traffic and Adverse Effects on Respiratory Health in Children," M. Wjst, P. Reitmeir, S. Dold, A. Wulff, T. Nicolai, E.F. von Loeffelholz-Colberg, and E. von Mutius, *British Medical Journal* 307: 596-600, 1993 [See Appendix A]

The authors of this study examine road traffic, as a surrogate for outdoor pollution, in Munich, Germany, with reference to pulmonary function and respiratory symptoms in children. They report a statistically significant decrease in peak flow rates associated with increases in automobile traffic. The authors note that the decrease was comparable to a decrease they had reported elsewhere in a study of parental smoking and children's lung function.

ETS EXPOSURE AND MONITORING

- [38] "Estimation of ETS Retention in Volunteers from Measurements of Exhaled Smoke Composition," A. Black, J.J. McAughey, D.A. Knight, C.J. Dickens, and J.C. Strong, *Proceedings of Indoor Air '93* 3: 41-46, 1993 [See Appendix A]

In this study, the authors measured the deposition of UVPM, solanesol and nicotine in ten male volunteers exposed to ETS in an experimental chamber. They report good agreement between the measurements for deposition of solanesol and UVPM, but indicate that nicotine deposition was substantially different. They conclude that nicotine is not a representative marker of exposure to ETS particulates.

- [39] "Measurement of Exposure to Environmental Tobacco Smoke in Pregnant Women Using Questionnaire, Personal Monitor and Urine Cotinine: A Problem in Exposure Monitoring," T.Z. O'Connor, B.P. Leaderer, T. Holford, and M.B. Bracken, *Proceedings of Indoor Air '93* 3: 373-378 [See Appendix A]

Three techniques for assessing ETS exposure are compared in this paper. The authors report no correla-

tion between reported exposure, assessed by questionnaire, and urinary cotinine. They report "fair" agreement between questionnaire responses and nicotine monitoring data.

INDOOR AIR QUALITY

- [40] "Environment and Well-Being Before and Following Smoking Ban in Office Buildings," I. Broder, C. Pilger, and P. Corey, *Canadian Journal of Public Health* 84(4): 254-258, 1993 [See Appendix A]

This paper reports on occupant-reported symptoms and measurements of indoor environmental quality before and after institution of a smoking ban. Changes occurred in occupants' perceptions of temperature and in symptom reporting. The authors describe the latter as ambiguous. With regard to IAQ measurements, CO₂ and VOCs were significantly decreased following the ban.

- [41] "The Pollutant Control Index: A New Method of Characterizing Ventilation in Commercial Buildings," W.J. Fisk, D. Faulkner, and A.T. Hodgson, *Proceedings of Indoor Air '93* 5: 9-14, 1993 [See Appendix A]

The authors of this paper introduce a new method for quantifying ventilation effectiveness in buildings. They propose using multiple emitters of tracer gas to simulate an indoor pollutant source, which would be measured over time.

- [42] "Varying Ventilation Conditions to Provide a More Complete Assessment of Building HVAC Operation and Indoor Air Quality," R. Menzies, R.M. Tamblyn, F. Nunes, J. Leduc, J. Pasztor, and R.T. Tamblyn, *Proceedings of Indoor Air '93* 6: 551-556, 1993 [See Appendix A]

The authors of this study, in which indoor environmental conditions were assessed in four Montreal office buildings, report significant variations in measured parameters within individual buildings. They suggest that such variations should be taken into consideration in estimations of occupant exposures.

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- [43] "The Effect of ETS and Other Combustion Products on the Indoor Concentration Levels of Radon Progeny and Activity Size Spectrum," L. Morawska and M. Jamriska, *Proceedings of Indoor Air '93* 4: 533-538, 1993 [See Appendix A]

Based on the results of experimental chamber studies, these authors, from an Australian University, report that the "unattached" fraction of radon progeny decreased in the presence of ETS. It has been suggested that a reduction in "unattached" radon progeny could result in a reduction of radon dose to the lung.

- [44] "Indoor Concentrations of Polycyclic Aromatic Hydrocarbons in California Residences and Their Relationship to Combustion Source Use," L. Sheldon, A. Clayton, R. Perritt, D.A. Whitaker, and J. Keever, *Proceedings of Indoor Air '93* 3: 29-34, 1993 [See Appendix A]

Based on measurements conducted in northern California, this study concludes that smoking, fireplace use, woodburning stove use, and kerosene heater use are the "strongest indoor sources" of benzo(a)pyrene in indoor air.

STATISTICS AND RISK ASSESSMENT

- [45] "Key Issues in Carcinogen Risk Assessment Guidelines, Society for Risk Analysis," E. Anderson, P.F. Deisler, D. McCallum, C. St. Hilaire, H.L. Spitzer, H. Strauss, J.D. Wilson, and R. Zimmerman, *Risk Analysis* 13(4): 379-382, 1993 [See Appendix A]

The Society for Risk Analysis held a workshop on cancer risk assessment under a cooperative agreement with the U.S. EPA and California EPA on December 4, 1992. Recommendations resulting from the workshop are published in this article. Workshop participants recommended that carcinogen classification should be part of the risk characterization stage of a risk assessment and should reflect all relevant information, and that more extensive use should be made of meta-analysis of human data, in addition to eight other recommendations.

- [46] "An Enforceable Indoor Air Quality Standard for Environmental Tobacco Smoke in the Workplace," J.L. Repace and A.H. Lowrey, *Risk Analysis* 13(4): 463-475, 1993 [See Appendix A]

This article claims to present new methodology for correlating nicotine measurements and lung cancer risk purportedly due to ETS exposure. See issue 56 of this Report, September 24, 1993; excerpts of the study are found in Appendix A of this issue.

IN EUROPE & AROUND THE WORLD

REGULATORY AND LEGISLATIVE MATTERS

AUSTRALIA

- [47] New Public Smoking Ban Likely in Canberra

Press reports indicate the Canberra government is expected to legislate smoke-free restaurants, bars and other enclosed public places within the next few months. Canberra's Health Minister has reportedly been pushing for the legislation for the last year. See *Canberra Times*, September 26, 1993.

AUSTRIA

- [48] Compromise On Draft Tobacco Bill in Austria

Austrian Health Minister Michael Ausserwinkler has reportedly introduced a compromise draft tobacco bill which would not require restaurants to designate no smoking areas as was earlier proposed. Also proposed in the compromise bill is a provision that would limit tobacco advertising. If passed, the new legislation would take effect on January 1, 1994. See *Salzburger Nachrichten*, September 14, 1993.

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CANADA

[49] Antismoking Bylaw is Passed in Durham Region

Pickering, a Durham Region municipality, has reportedly passed a bylaw that in September 1993 prohibits smoking in malls, beauty salons, service lineups, theatres, recreation centres and reception areas. Smoking will also be restricted to 30 percent of the seating area in restaurants and 50 percent of the floor area of bingo halls and bowling alleys. The bylaw apparently follows the criteria set down by the region's health department. Several other Durham municipalities are said to be considering public smoking bans. See *Toronto Star*, September 30, 1993.

[50] Health Agencies Plan to Picket NDP Caucus

Representatives of health agencies reportedly planned to demonstrate on September 22, 1993, at a New Democratic Party (NDP) Caucus meeting following a reported leak of a NDP legislative priorities list that will purportedly recommend the Ontario Tobacco Act should not be introduced during the remainder of the government's term. A spokesperson for the group was quoted as saying that passage of the act is "essential to help us reach our regional goals of no sales to minors and smoke-free public and workplaces." The Act has apparently been promised, and continually delayed, by the government since the spring of 1991. See *Canada NewsWire*, September 22, 1993.

UNITED KINGDOM

[51] HEA Wants Teachers to Set Nonsmoking Example

The Health Education Authority (HEA) has reportedly launched a campaign to persuade teachers to set an example for children by not smoking on school property. HEA hopes that schools will extend the smoking restrictions to school buildings and grounds, vehicles, out-of-school events, and outside users of the premises. A recent survey conducted for the HEA reportedly revealed that nearly three in five MPs advocated a smoking ban in schools and 38 percent said they would support special zones for smokers. However, ASH chairman Jerry Hayes stated that "a

ban would cause more trouble and anxiety than it was worth" and that no-smoking arrangements should be voluntary. The National Union of Teachers apparently supports voluntary staffroom bans and possible "special smoking rooms." See *The Guardian*, September 18, 1993.

ETS-RELATED LITIGATION INVOLVING
CIGARETTE MANUFACTURERS

AUSTRALIA

[52] *TIA v. Stephen Woodward* (Supreme Court, Equity Division, New South Wales) (filed April 15, 1993; tried September 6-7, 1993)

Stephen Woodward has filed his "submissions" to the court following trial in this Fair Trading Act action. Woodward's submissions argue that the statements he made were not made in the course of any business and therefore cannot constitute a violation of the Fair Trading Act which, according to Woodward, addresses conduct "in trade or commerce" that is misleading or deceptive. Woodward states that his conduct as executive director of ASH was solely directed toward educating the community and legislators.

Woodward also urges the court to consider the context in which his statements were made. He states that they were made in live interviews with imprecise language in the context of an "ongoing debate between adversaries." He also denies that some of his statements were misleading or deceptive and he claims that they were not made in permanent form nor will they be repeated as ASH is ceasing operations and Woodward is leaving the country for two years.

The action was brought by TIA on the basis of misleading statements allegedly made by Woodward about the judgment of the full federal court in *AFCO v. TIA* and the EPA Risk Assessment on ETS. Further details regarding the trial appear at issue 55 of this Report, September 10, 1993. The court gave both parties the opportunity to submit written summations before it reaches a decision in the case.

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LEGAL ISSUES AND DEVELOPMENTS

AUSTRALIA

[53] Legal Publication Focuses on Tobacco Litigation

The September 1993 issue of the *Australian Product Liability Reporter* is devoted to articles dealing with the most recent developments in litigation involving tobacco products. One of the articles, entitled "Workplace Exposure to Cigarette Smoke," claims that workers have been successful in nine workers' compensation claims. The authors, attorneys with Maurice Blackburn & Co. in Melbourne, argue that knowledge by employers of the purported dangers of ETS exposure can be dated to 1986 with the issuance of a report on ETS by the National Health and Medical Research Council. The authors also refer to the EPA Risk Assessment on ETS.

Another article, entitled "Passive Smoking and Family Law," indicates that there are no reported cases in Australia yet regarding the effect of ETS on child custody proceedings. The author observes, "Evidence of the effect of passive smoking on the welfare of a child will largely depend upon: (a) the medical condition of the child; (b) evidence of the effects of passive smoking upon people and especially children; (c) the extent of the smoking; and (d) the ages of the children."

An article on ETS in prisons opens with a discussion of the U.S. case *Helling v. McKinney*. The author argues that similar proceedings could be undertaken in Australia under related international standards and state statutes. There are also articles involving disability discrimination claims and smoking on airlines. See *Australian Product Liability Reporter*, September 1993.

CANADA

[54] Supreme Court Hears Argument on Application for Injunctive Relief

On October 4, 1993, the Supreme Court of Canada heard arguments on the application of Imperial Tobacco Ltd. and RJR MacDonald Inc. to suspend the cigarette labelling provisions of the Tobacco Products Control Act while their challenge to the Act is on appeal. The warnings, which would include an ETS warning, are scheduled to go into effect in 1994, and

the tobacco companies argue that it will cost them \$30 million to redesign their packaging to conform to the Act.

Although the high court has not yet decided whether it will take the appeal on the merits of the case, the tobacco companies were reportedly planning to argue that the redesign costs will be wasted if the court ultimately takes the case and rules against the Act. See *The Vancouver Sun*, September 25, 1993.

UNITED KINGDOM

[55] Pubs Urged to Go Smoke Free

Edinburgh health officials are reportedly studying the question of whether pub owners are violating the Health and Safety at Work Act by exposing workers to ETS. The city's health director was quoted as saying that it's "generally accepted that there is a direct relationship between environmental tobacco smoke and ill health." He stated he plans to "seriously consider the question of health and safety at work in relation to passive smoking." In response, bar owners say they will install ventilators but that smokers are a part of pub atmosphere. Currently, eight percent of Scotland's pubs are said to have designated smoking sections. See *The Independent*, September 21, 1993.

OTHER DEVELOPMENTS

CANADA

[56] Northerners Surveys on Smoking Restrictions

The Northern Regional Health Survey reportedly revealed that half the population surveyed thought smoking should be banned in cafes and restaurants. The survey also apparently indicated that 40 percent of males aged 18-30 years smoked, compared with 28 percent of females. See *Courier Mail*, September 29, 1993.

KUWAIT

[57] Smoking Banned in Radio and Television Station

Press reports indicate that the Ministry of Information has banned smoking on the premises of Kuwait's radio and television station and that anyone caught

smoking will be penalized by a deduction of five days salary. See *Al Watan*, September 22, 1993.

SWEDEN

[58] Researchers Claim More Women Suffer from "Sick Building Syndrome"

Swedish researchers have reported that women are three times more likely than men to suffer from symptoms associated with "sick building syndrome (SBS)." Dr. Bernt Stenberg, a researcher at Sweden's University Hospital, said the reasons women report more symptoms lay with biological and social differences between men and women. He said that women lead more stressful lifestyles because they tend to take on more responsibilities than men. He stated that women have more active immune systems, which are more likely to overreact, causing illnesses and allergies, and that women have drier eyes, mouth and mucus membranes, making them more susceptible to typical SBS symptoms. See *The Age*, September 28, 1993.

UNITED KINGDOM

[59] Welsh Couple Told They Cannot Be Foster Family

In October 1992 the British Agencies for Adoption and Fostering (BAAF) recommended that children up to the age of two, and those children suffering from respiratory problems, should not be placed in households with smokers. Now, the agency has reportedly told a Welsh couple they can no longer serve as foster parents because they are obese. The couple have been fostering children for a reported four years and there have apparently been no complaints against them. The doctor who examined the couple in order to determine whether they were fit to serve as foster parents stated that she had concerns about the health of the couple and the example being set to the child. She also stated that there is a "profound psychological disorder commonly associated with obese people." See *The Independent*, October 1, 1993.

[60] ASH Provides "Breathing Space" Campaign Materials

Action on Smoking and Health (ASH) has produced a packet of materials for the Europe Against Cancer

Programme's Breathing Space campaign. The materials provide tips and suggestions on approaching proprietors of shops, banks and restaurants to convince them to introduce smoke-free areas in their establishments. The pack also includes campaigning ideas, publicity ideas, "facts and figures" on ETS and "Breathing Space" calling cards to leave in "unpleasant smoky restaurants or pleasant smoke-free ones."

MEDIA COVERAGE

AUSTRALIA

[61] "Health Fascists Hide Behind Smokescreen," P. McGuinness, *The Australian*, September 22, 1993

This editorial discusses the recent Australian court decision by a West Australian magistrate that passive smoking is "not a proven threat" to health. (*Department of Occupational Health and Safety v. Burswood Resort*). The author, Padraic McGuinness, argues that anti-smoking forces in Australia have "disseminated the lie that the courts have accepted that passive smoking is harmful to health," based on the *AFCO* decision. McGuinness states that there is "no good reason for employers to ban smoking in the workplace." McGuinness argues that antismoking advocates are not honest about their motives, and should freely admit that, although it may be annoying or even offensive, it has not been proven to be harmful. He concludes that "it's simply incorrect to misuse occupational health considerations as a lever to prevent it."

CANADA

[62] "A Little Tolerance, Please," N. Boyd, *The Vancouver Sun*, September 17, 1993

Neil Boyd, a criminology professor at Simon Fraser University, writes about the "tobacco wars." He discusses the issue of ETS, stating that "the evidence is equivocal.... Only about half of the published studies with large population bases have been able to establish a statistically significant relationship between exposure to second-hand smoke and lung cancer." Boyd suggests that the data is stronger and more consistent with regard to the alleged health effects of ETS on children. He recommends that ETS in front of chil-

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dren should be "denounced" and that in the workplace and public buildings, it "should be resisted" because it is an intrusive odor. He suggests that there also be room for tolerance, due to the alleged addictive properties of tobacco. Boyd also discusses the trend of economically penalizing the smoker, and he says that "the physical toll of a lifetime of consumption is probably sufficient punishment."

UNITED KINGDOM

[63] "Who's Sleeping in Your Bed?," N. Hawkes,
The Times, September 21, 1993

This article discusses the danger allegedly posed to human health by dust mites. According to the author, doctors apparently believe that "a large proportion of allergic diseases, including asthma, eczema, and rhinitis, are caused by the mites, or rather by their droppings." The author also reports that there is evidence that particles in ETS and diesel exhausts may activate antibodies that produce a strong allergic reaction when exposed to mite droppings. The article concludes with advice on how to reduce indoor concentrations of dust mites.

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APPENDIX A

The numbers assigned to the following article summaries correspond with the numbers assigned to the synopses of the articles in the text of this Report.

LUNG CANCER

- [36] "Epidemiological Studies Relating Family History of Lung Cancer to Risk of the Disease," P.N. Lee, *Indoor Environment* 2: 129-142, 1993

"In the Western world, though seemingly not in many poorer countries, the risk of developing lung cancer as a consequence to [sic] indoor air pollution is, at most, low. Attempts to detect and quantify such risks require the accurate determination of exposure and disease status and avoidance of the various sources of bias to which so many studies are subject. Because there is no method currently available to determine whether a specific lung cancer has arisen from a particular exposure, it is important to be aware of, and control for, other variables that are known to influence lung cancer risk. Exposures claimed to result in lung cancer include smoking, environmental tobacco smoke (ETS), various occupational chemicals, asbestos, the progeny of radon, and even domestic bird keeping."

"Apart from environmental causes, it is of course likely there will be genetic variation in susceptibility to disease. The present paper investigates this possibility by reviewing the epidemiological evidence of family history of lung cancer as a risk factor for the disease."

"[R]eference has been made to 13 case-control studies which have provided some information on the risk of lung cancer in relation to family history of lung cancer."

"Although insufficient details are given in the studies to allow accurate meta-analysis, it is evident that, at least in Western populations, there is a highly significant relationship between family history of lung cancer and risk of lung cancer. Thus, while no association was seen in the studies by Gao et al. and Tsugane et al. (conducted in China and Japan), a consistent positive relationship was seen in the other 11 studies (conducted in the US, UK or Canada), with relative risk estimates of 1.28, 1.8, 1.9, 1.99, about 2, 2.02, 2.28, 2.35, 2.4, about 2.6, and 5.31; 7 of which were statistically significant."

"There is an approximate doubling of risk of lung cancer in relation to having a relative with lung cancer that does not seem to be explicable in terms of confounding effects of age, smoking habits, family size or other variables. The association has been seen in studies where recall bias can probably be ruled out as an explanation. The association does not seem to be specific to any type of relative or type of lung cancer."

"It seems likely that this association reflects differences in lung cancer risk between genotypes. If so, the differences in risk between genotypes will be much larger than the 2-fold factor observed, since risk associated with family history markedly underestimates risk associated with a particular genotype. It would be prudent to consider the possibility of family history of lung cancer in the design or interpretation of epidemiological studies on environmental factors and lung cancer."

RESPIRATORY DISEASES AND CONDITIONS — CHILDREN

- [37] "Road Traffic and Adverse Effects on Respiratory Health in Children," M. Wjst, P. Reitmeir, S. Dold, A. Wulff, T. Nicolai, E.F. von Loeffelholz-Colberg, and E. von Mutius, *British Medical Journal* 307: 596-600, 1993

"Objectives — To examine whether road traffic in a big city has a direct effect on pulmonary function and respiratory symptoms in children."

"Main outcome measures — Variables of pulmonary function by forced expiration and respiratory symptoms reported in a questionnaire; census data on car traffic collected in the school district."

"Multiple regression analysis of peak expiratory flow showed a significant decrease of 0.71% (95% confidence interval 1.08% to 0.33%) per increase of 25000 cars daily passing through the school district on the main road. Maximum expiratory flow when 25% vital capacity had been expired was decreased by 0.68% (1.11% to 0.25%).... The adjusted odds ratio for the cumulative prevalence of recurrent wheezing with the same exposure was 1.08 (1.01 to 1.16). Cumulative prevalence of recurrent dyspnoea was increased, with

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an odds ratio of 1.10 (1.00 to 1.20). Lifetime prevalence of asthma (odds ratio 1.04; 0.89 to 1.21) and recurrent bronchitis (1.05; 0.98 to 1.12) were not significantly increased."

"To determine the effect of road traffic the natural logarithm (ln) of the pulmonary function value was modelled with parental history of asthma, ln (height), ln (weight), month of examination, compliance with test, number of cigarettes smoked at home daily, and indoor use of gas or coal for cooking or heating. School education of parents served as indicator of socioeconomic state."

"Multiple logistic regression was used to estimate the effect of the traffic count on respiratory symptoms while the effects of parental history of asthma, parental school education, number of people in household, use of gas or coal for cooking or heating, month of survey, number of cigarettes smoked at home, and who completed the questionnaire were controlled for. These confounders have been described as relevant in a comparable setting."

"Our decrease in peak flow rates is comparable with the effect of passive smoking in the same population studied by Dold et al, in which the peak flow of children with parents who smoked was decreased by 2.5% (1.3% to 3.8%, [reportedly statistically significant]) compared with children with parents who did not smoke."

ETS EXPOSURE AND MONITORING

- [38] "Estimation of ETS Retention in Volunteers from Measurements of Exhaled Smoke Composition," A. Black, J.J. McAughey, D.A. Knight, C.J. Dickens, and J.C. Strong, *Proceedings of Indoor Air '93* 3: 41-46, 1993

"[E]xposure to environmental tobacco smoke (ETS) is only one of many factors which affect the deposition, and hence dose, of these smoke components. One of the most important of these additional factors is the degree of deposition of ETS particulates relative to other more volatile ETS components.... The principal objective of the work described here has been to enlarge this limited database of the proportion of the inhaled

particulate phase of environmental tobacco smoke (ETS) which is retained by non-smokers, by carrying out measurements of deposition of particulate material from aged and diluted sidestream smoke in ten male volunteers. This has been carried out by measurement of inhaled and exhaled components of ETS, with calculation of their deposition by difference. The components of the smoke aerosol measured were nicotine, UVP, and solanesol... Exposures of all subjects were carried out at two concentration levels of ETS, equivalent to mean and maximum values reported from environmental surveys."

"Results for deposition of ETS particulates in the male volunteers are consistent for both high and low level exposures with a mean deposition fraction of approximately 40%. This is higher than previous assumptions made for particulate deposition."

"At high level exposure levels, mean deposition fractions for solanesol of 40% were observed. Thus, the solanesol deposition value for male volunteers is in excellent agreement with the UVP values. No solanesol results have been reported from the low level exposure data."

"Nicotine deposition was significantly different from particulate deposition, with calculated fractional deposition values of 70-80%."

"These data confirm that nicotine retention estimates do not offer a representative measure of ETS exposure.... It can also be noted that the relationship between nicotine and particulate deposition for ETS differs from [that] of mainstream smoke. This study confirms that risk estimates for exposure to ETS must consider the physical form of the exposure and how these can affect dosimetry."

- [39] "Measurement of Exposure to Environmental Tobacco Smoke in Pregnant Women Using Questionnaire, Personal Monitor and Urine Cotinine: A Problem in Exposure Monitoring," T.Z. O'Connor, B.P. Leaderer, T. Holford, and M.B. Bracken, *Proceedings of Indoor Air '93* 3: 373-378

"Three methods of assessing ETS exposure are available — questionnaire, air monitor (personal and microenvironmental), and urine cotinine.... The question is often asked which is the most useful and

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accurate exposure measurement. In a large epidemiological study of ETS exposure in pregnant women we used the three measurement methods and here present a view of their usefulness."

"The level of air nicotine concentration was significantly higher in those reporting exposure compared to those reporting no exposure. The level of urine cotinine did not differ for the exposed and nonexposed."

"Of those reporting exposure, 32% reported exposure at home, 25% at work, and 74% on social occasions....[W]hile not significantly different, the mean average daily number of cigarettes to which subjects were exposed at work was more than twice the number to which they were exposed at home."

"Agreement between the questionnaire and monitor for classifying a subject as exposed was 'fair,' with 36% misclassification."

"The subjects in this study were predominantly white, middle class pregnant women and, as such, the low levels of exposure experienced by them are atypical. These low levels are not representative of other SES groups or of exposures experienced by women in countries where there are fewer regulations limiting smoking in public and in the workplace. In this sample of pregnant women, there was better agreement between the air monitor and questionnaire than between urine cotinine and questionnaire. However agreement was only 'fair' and there was 36% misclassification when exposure as determined by questionnaire was compared to exposure as determined by the monitor. Due to the difficulty of accurately estimating exposure to ETS by questionnaires, modeling of ambient air nicotine from self-reported exposure data may not be practical. Questionnaires are needed to determine time-activity patterns, important exposure locations, and broad exposure categories. As smoking regulations increase at the work site, residential, social and recreational exposures will become more important. The amount of misclassification associated with questionnaires must be considered when estimates are made of risks for adverse pregnancy outcomes associated with exposure to passive smoking."

INDOOR AIR QUALITY

- [40] "Environment and Well-Being Before and Following Smoking Ban in Office Buildings," I. Broder, C. Pilger, and P. Corey, *Canadian Journal of Public Health* 84(4): 254-258, 1993

"The purpose of the following study was to further explore the possible adverse effects of ETS in office buildings, before and after the introduction of a smoking ban."

"The mean cotinine level is 6.54 ng/ml in the first survey and 4.98 ng/ml in the second, but this change is not statistically significant."

"The level of light, glare and noise is considered to be satisfactory by a majority of workers at the first survey, and that of air movement and freshness unsatisfactory. The perception of humidity, odour and temperature are [sic] approximately balanced between favourable and unfavourable. At the second survey, there is a significant change only in the perception of temperature."

"Generally, the temperature, CO, CO₂ and particulates levels are within accepted levels. The humidity levels are low. The mean level of ionizable substances (likely volatile organic compounds) is at the upper end of the accepted range. There is significant reduction in ionizable substances, temperature and carbon dioxide at the second survey."

"The small decrease in questionnaire symptom reporting observed at the second survey may be related to the introduction of the smoking ban, or may be a consequence of surveying the same population a second time."

"The combustion of tobacco is known to generate volatile organic compounds. Accordingly, there is some credibility to the decreased level of ionizable substances found at the second survey.... We found a significant decrease in the questionnaire reporting of eye irritation and headache at work in the second survey. Although a connection with the lower levels of volatile organic compounds is plausible, the alternative attribution of this decrease to a second administration of the questionnaire cannot be excluded."

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- [41] "The Pollutant Control Index: A New Method of Characterizing Ventilation in Commercial Buildings," W.J. Fisk, D. Faulkner, and A.T. Hodgson, *Proceedings of Indoor Air '93* 5: 9-14, 1993

"[W]e introduce the local and global pollutant control indices (PCI). These parameters quantify the effectiveness of ventilation in controlling the concentrations of a simulated indoor-generated air pollutant. In the proposed measurement procedure, an indoor pollutant source is simulated by deploying multiple passive emitters of tracer gas throughout the building. Using a programmable sampler, time-average tracer gas concentrations are determined during occupancy periods near locations where occupants breathe."

"Practical techniques of measuring the quantity of ventilation in commercial buildings over extended time periods are clearly needed. In response to this need, this paper introduces a simple new concept for characterizing effective ventilation rates in buildings and describes the measurement technique under investigation."

"The advantages of this measurement technique, compared to the traditional measurements of normalized outside air flow rates, are numerous. Valid measurements do not depend on stable air flow rates, perfect mixing of the indoor air, a known or stable occupancy, or a small rate of air infiltration or exfiltration. The PCI can be measured for an extended period of occupancy (e.g., a forty hour work week). If the building ventilation system is shut down at night, the measured PCI values incorporate the impact of the reduced night-time ventilation on pollutant exposure during the period of occupancy. The users of the tracer sources and samplers do not need to be experts in tracer gas techniques or experts in building ventilation. Finally, the labor required to measure PCIs is less than that associated with the performance of tracer gas stepups and decays."

- [42] "Varying Ventilation Conditions to Provide a More Complete Assessment of Building HVAC Operation and Indoor Air Quality," R. Menzies, R.M. Tamblyn, F. Nunes, J. Leduc, J. Pasztor, and R.T. Tamblyn, *Proceedings of Indoor Air '93* 6: 551-556, 1993

"Failure to account for spatial or temporal variation in the characterization of workers' contaminant

exposures may lead to random misclassification of exposure, tending to reduce the likelihood of finding any association.... We have analyzed the effect of building, floor, and worksite factors, as well as changes in outdoor air supply, on changes in indoor contaminant levels."

"Outdoor temperature and humidity affected indoor humidity, while changes in CO₂ reflected... changes in outdoor air supply. On the other hand the majority of the variation of formaldehyde, CO, and NO₂ was attributable to the buildings, while the majority of the variability of TVOCs, dust, fungi, temperature, and air velocity was associated with floor and site. This would indicate that there were significant differences between buildings in levels of formaldehyde, CO, and NO₂, and important differences in the exposures of workers in the same buildings to TVOCs, dust, fungi, temperature, and air velocity."

"The data from this study demonstrates [sic] that there is significant variability of contaminant concentrations within buildings, related to outdoor conditions, outdoor air supply, and local conditions. As well there were significant differences between buildings in the concentrations of certain contaminants, and the changes in contaminant concentrations with outdoor air supply."

"The strengths of this study are that a large number of measures were made, while ventilation conditions were varied to stimulate seasonal changes in outdoor air supply. The study was conducted in four air-conditioned mechanically ventilated high-rise office towers with sealed windows, building characteristics considered typical for problems of SBS."

"On the other hand, given the differences between buildings in contaminant levels, and response to changes in outdoor air supply, inferences from this study are limited because only four buildings were studied. As well, in view of the variability in contaminant concentrations between sites and floors, measurement at only 1-3 sites per floor may not have been adequate to fully characterize these contaminants."

"[I]n view of the variability of these measures, between sites and floors, within the same buildings, in this study, it is evident that characterization of many worksites is important to avoid misclassification of exposures."

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- [43] "The Effect of ETS and Other Combustion Products on the Indoor Concentration Levels of Radon Progeny and Activity Size Spectrum," L. Morawska and M. Jamriska, *Proceedings of Indoor Air '93* 4: 533-538, 1993

"It has been recognised that the radiological health hazard due to inhalation of airborne radon progeny depends not only on the total concentration level of the progeny, but also on the activity size spectrum. The aim of this work was to measure the activity size distribution in an indoor environment of controlled radon concentration and controlled relative humidity in the presence of ETS, petrol smoke and kerosene."

"From the point of view of the radiological health hazard, the key issue is the form in which the progeny exists in the air: in the unattached form, or attached to the environmental aerosol particles. The most important factors which affect interaction between radon progeny and environmental aerosols are concentration of radon, concentration and size distribution of environmental aerosol, nature of the aerosol, presence of trace gases and relative humidity."

"After introducing the aerosol, the progeny concentration always increased and did not fluctuate significantly....Introduction of aerosol to the chamber (cigarette smoke, etc) results in establishing equilibrium conditions in the chamber, which is not affected by fluctuation of the aerosol concentration."

"For all the measurements size distribution was found to be bimodal with the smaller fraction (or 'unattached' fraction) always below 10 nm....There is no dependence between the unattached fraction and radon concentration when only natural environmental aerosol is present in the chamber. Change in the environmental condition can significantly affect the unattached fraction (and the size distribution in general) as it was experienced during the measurements. When cigarette smoke is present in the chamber, unattached fraction decreases with increasing radon concentration."

- [44] "Indoor Concentrations of Polycyclic Aromatic Hydrocarbons in California Residences and Their Relationship to Combustion Source Use," L. Sheldon, A. Clayton, R. Perritt, D.A. Whitaker, and J. Keever, *Proceedings of Indoor Air '93* 3: 29-34, 1993

"Polynuclear aromatic hydrocarbons (PAHs) are semivolatile organic chemicals that are formed during

the combustion process. Important indoor sources for PAHs include smoking, woodburning, gas heating, and cooking or grilling of foods. Major outdoor sources include automobile exhaust and smoke from woodburning sources."

"The study reported here extends the available information by evaluating the effects of combustion sources on PAH air concentrations in a large sample in northern California that represents homes with specific combustion source use. This paper summarizes air concentration and source strength data generated for benzo[a]pyrene (BaP)."

"These data show several interesting trends. First, homes with smoking, fireplace use and woodstove use had higher indoor air concentrations, indoor/outdoor concentration ratios, and calculated source strengths for BaP than control homes. Homes with gas heat did not show elevated BaP concentrations compared to the control category. Highest values for indoor concentration, concentration ratios and SS were seen for homes with smoking both with and without fireplace use....[O]utdoor air may provide a substantial BaP source for indoor air pollution....[F]or outdoor air, homes with woodburning appeared to have elevated BaP concentrations compared to homes without."

STATISTICS AND RISK ASSESSMENT

- [45] "Key Issues in Carcinogen Risk Assessment Guidelines, Society for Risk Analysis," E. Anderson, P.F. Deisler, D. McCallum, C. St. Hilaire, H.L. Spitzer, H. Strauss, J.D. Wilson, and R. Zimmerman, *Risk Analysis* 13(4): 379-382, 1993

"On December 4, 1992, the Society for Risk Analysis (SRA) held a workshop — under a cooperative agreement with the U.S. Environmental Protection Agency (U.S. EPA) and the California Environmental Protection Agency (Cal-EPA) — to examine three issues in cancer risk assessment:

Improvement of risk characterization.

Use of meta-analysis.

Use of biological data in qualitative and quantitative risk assessments."

"Recommendations"

"1. Begin the risk assessment process by identifying what information the risk manager needs to make a risk management decision and to help other understand that decision."

"2. Consider mechanism of action information early in the hazard assessment."

"3. Draw conclusions only during the risk characterization stage; use the hazard identification, dose-response assessment, and exposure assessment for evaluation only. The various 'steps' in the risk assessment process form an integrated whole. Premature summaries...can inhibit the interactive assessment necessary for characterization and distort the results."

"4. The risk assessment should include a best estimate based on the totality of the available data and the *uncertainty* in the data and its quality. This estimate should describe the likelihood that different values within the range of uncertainty represent measurable effects....More scientifically and statistically defensible approaches would be the use of a 'best' estimate that considers all the data and data uncertainties and provides a *distribution* of scientifically plausible values."

"5. Make uncertainty explicit in every stage of the risk assessment process."

"6. Develop a technique to make transparent the expert judgments that influence the risk assessment and the overall degree of confidence in the assessment."

"7. Carcinogens should be classified during the risk characterization stage using a new classification system with a small number of clearly defined terms. Classification should be part of risk characterization (instead of hazard identification), and it should reflect *all* the relevant information in the risk assessment (i.e., it should be information rich rather than essentially a 'vote-counting' approach that relies solely on the number of positive studies found in the literature)."

"8. The risk characterization should include a concise narrative that clearly describes, in qualitative terms, the expected harm to humans at likely human exposures."

"9. More extensive use should be made of appropriately conducted meta-analyses of human data for risk assessment....[M]eta-analyses can result in inaccurate conclusions if they are not properly conducted. A

properly conducted meta-analysis should begin with development of a protocol that describes the criteria to be used for identifying and including studies (both published and nonpublished), methods to be used for evaluating and incorporating study quality, heterogeneity, subgroup analysis, and other relevant factors."

"10. Consider assigning a 'reasonable worst case' default value when insufficient information is available to assess the safety of a chemical."

"The U.S. EPA's use of science advisory bodies to provide public peer review is exemplary, although it has been suggested that the openness of that review process to public input can be improved."

[46] "An Enforceable Indoor Air Quality Standard for Environmental Tobacco Smoke in the Workplace," J.L. Repace and A.H. Lowrey, *Risk Analysis* 13(4): 463-475, 1993

"[W]orkplace smoking policies to restrict nonsmokers' exposure to ETS are being increasingly mandated by legislatures, considered by regulatory agencies, or voluntarily adopted by business. However, workplace smoking policies short of bans may reduce, but do not eliminate, nonsmokers' exposures. Accordingly, there is a need for an enforceable indoor air quality standard for ETS, so that regulators may quantify the risks in any indoor airshed. With such a standard, any residual ETS exposure after imposition of controls can be evaluated as 'acceptable' or 'unacceptable,' relative to established regulatory criteria for risk from exposure to environmental carcinogens."

"In 1985, Repace and Lowrey proposed a health-based indoor air quality standard based upon respirable suspended particulate (RSP) air pollution from ETS....Newly available data now permit development of a method to use ETS nicotine levels as a quantitative surrogate for the carcinogenic risk of ETS in individual workplaces, and for deriving a legally enforceable health-based indoor air quality standard for ETS, usable by federal and state regulatory agencies."

"In creating an enforceable indoor air quality standard for the workplace carcinogen ETS, the fundamental problem to be solved is to develop a model correlating levels of substances uniquely associated with ETS exposure (nicotine and its metabolite, cotinine), and highly correlated with number of cigarettes smoked,

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and hence with the lung cancer risk caused by ETS. To accomplish this, we modify our previously developed model relating the lung cancer risk from ETS exposure to the nonsmoking population's exposure to ETS-associated respirable suspended particulate (RSP)...[N]icotine and cotinine, which are the best available markers for ETS exposure and dose, therefore also serve as the most suitable markers for the carcinogenic effect of ETS, despite their own apparent lack of carcinogenic activity."

"Several U.S. federal regulatory agencies promulgate regulations and standards to protect the public from exposure to environmental carcinogens. It is of interest to inquire as to what levels of population cancer risk typically trigger regulation, what levels are beneath regulatory concern, and how consistently are they applied among various federal agencies.... Travis et al. describe two technical risk assessment terms: *de manifestis* risks and *de minimis* risk. A *de manifestis* risk is literally 'a risk of obvious or evident concern,' and has its roots in the legal definition of an 'obvious risk' (i.e., one recognized instantly by a person of ordinary intelligence). *De manifestis* risks are those that are so high that U.S. federal regulatory agencies almost always acted to reduce them, and *de minimis* risks are so low that agencies almost never acted to reduce them. For various reasons, risks falling in between these extremes were regulated in some cases but not in others, however, residual risks after control are generally *de minimis*. Travis et al. found when the population at risk was large, as with ETS, *de manifestis* risk corresponded to 3×10^{-4} , and *de minimis* risk was 1×10^{-6} ."

"How does the risk from ETS compare with the federal *de manifestis* risk level? Using the available data for late 1980s cotinine concentrations in nonsmokers' body fluids, we have estimated the aggregate population risk from ETS at [approximately] 2 to 3×10^{-3} (consistent with estimates made using other methods), an order of magnitude above the *de manifestis* risk level."

"Another way of understanding the import of such risk probabilities is to multiply the aggregate risk by the population at risk (in the case of lung cancer, nonsmokers aged ≥ 35 years) in order to estimate the annual mortality. In 1990, there were [approximately] 50.7 million lifelong nonsmokers and [approximately] 34.6 million ex-smokers in this population category. A 2 to 3×10^{-3} lifetime risk (assuming 40 years' exposure to the working population) corresponds to a 5 to 7.5 x

10^{-5} annual risk, and when applied to the nonsmoking population of 85.4 million nonsmokers at risk produces [approximately] 4000-6000 lung cancer deaths (LCDs) per year, consistent with the risk estimates of 5000 ± 2500 LCDs per year, adjusted to 1988, produced by other methods. By comparison, the U.S. Environmental Protection Agency has strictly regulated as Hazardous Air Pollutants under Section 112 of the Clean Air Act, airborne human carcinogens involving far lower numbers of estimated deaths, such as benzene (<8 cancer deaths per year) (CDs/year) arsenic (<5 CDs/year), vinyl chloride (<27 CDs/year) (all EPA estimates before control and at the 95% upper confidence limit). In contrast, *de minimis* exposure of the entire nonsmoking population at risk for a working lifetime of 40 years, would result in ≤ 2 LCDs/year."

"In summary, based upon the available information on current ETS nicotine exposure levels...and the nicotine-risk model presented here, it appears that the risks to white collar, blue collar, and service workers from ETS in many workplaces considerably exceed the *de manifestis* level which triggers strict federal regulation of carcinogens. Control of nonsmokers' ETS exposure to levels of *de minimis* risk using methods short of complete elimination of smoking in the workplace does not appear likely — particularly if the additional risk of heart disease mortality from ETS is considered."

"For atmospheric nicotine in the workplace, the *de minimis* or 'acceptable' lifetime risk level of 1 lung cancer death per million nonsmokers at risk occurs at 7.5 nanograms per cubic meter (8-hr time-weighted average.) For cotinine in body fluids, *de minimis* risk occurs at a daily average level of 2.6 picograms of cotinine per milliliter of urine excreted, or at a level of 0.4 picograms of plasma cotinine. *De manifestis* risk occurs at a 2.3 micrograms per cubic meter of workplace air, 8-hr time weighted average (TWA). For cotinine in body fluids, *de manifestis* risk occurs at 0.8 nanograms of cotinine per milliliter of urine, or 0.12 nanograms of cotinine per milliliter of plasma."

"We estimate the median 1980s U.S. lung cancer population risk from passive smoking to be about 2×10^{-3} , and estimate that the most heavily exposed nonsmokers have a lifetime lung cancer risk from ETS of about 2%."

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APPENDIX B

UPCOMING SCIENTIFIC MEETINGS

- **October 23, 1993**
Indoor Air Quality: An Overview for People Who Need to Know, AIHHM, Santa Fe, New Mexico [In This Issue] Same program to be held December 15, 1993, San Antonio, Texas; March 4, 1994, Orlando, Florida; April 13, 1994, Minneapolis, Minnesota; May 5, 1994, Chicago, Illinois; June 17, 1994, Oklahoma City, Oklahoma; July 14, 1994, Anchorage, Alaska
- **November 7-10, 1993**
Indoor Air Quality '93: Operating and Maintaining Buildings for Health, Comfort and Productivity, ASHRAE, Philadelphia, Pennsylvania [Issue 49, Item 34]
- **November 11-13, 1993**
Contemporary Concepts of Indoor Air Quality, Hacettepe University, Ankara, Turkey [Issue 49, Item 36]
- **December 16-17, 1993**
The National Environmental Tobacco Smoke Conference: Public Battles, Private Choices, IAQ Publications, Washington, D.C. [Issue 55, Item 34]
- **May 5-7, 1994**
Second Annual IAQ Conference and Exposition, NCIAQ, Tampa, Florida [Issue 49, Item 35]
- **May 22, 1994**
Indoor Air Quality Symposium, American Industrial Hygiene Conference and Exposition, Anaheim, California [In This Issue]
- **October 18-20, 1994**
Indoor Air Quality in Asia, Beijing, China [Issue 54, Item 42]

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